

Outbreak 101

Investigating a Legionnaires' Disease Outbreak in a Hotel

Objectives

This session is targeted towards public health investigators in order to help them learn and understand the mechanics of performing a Legionnaires' disease (LD) investigation in a hotel. The exercise will comprise of an outbreak scenario and moderators will help attendees work through the scenario to highlight important aspects and considerations. At the end of this session, attendees should be able to:

- Understand how to recognize an outbreak and the initial steps that should be taken
- Understand important aspects of an environmental investigation
- Understand methods for case finding and guest notification
- Understand follow-up protocols

Logistics

Attendees will be given pieces of information throughout the session to both further explain the outbreak as well as to add complicating context and considerations. We will provide 1 initial scenario, and then 2 updates to that scenario. The room will be divided into groups; 5 groups total. When attendees are handed new pieces of information, moderators will provide an explanation and then allow groups to discuss what their next steps would be. Then we will reconvene as a larger group to move forward. This will allow attendees to have an opportunity to analyze the scenarios and work with their group partners to think about next steps.

Timeline- 50 minutes

1. Introduction and explanation – 5 minutes
2. Part One – 15 minutes total
 - Background – 5 minutes
 - Questions/Discussion – 10 minutes
3. Part Two – 15 minutes total
 - Background – 5 minutes
 - Questions/Discussion – 10 minutes
4. Part Three – 10 minutes total
 - Background – 3 minutes
 - Questions/Discussion – 7 minutes
5. Final thoughts and wrap up – 5 minutes

Part One

Background

On December 28, 2018, the Utah Department of Health is notified by the Centers for Disease Control and Prevention (CDC) of a confirmed case of Legionnaires' disease in a Texas resident who had traveled to and stayed at "Ski Resort A" in Park City, UT during her exposure period. The case reported using the resort's hot tub as well as the shower in her room. She also reported spending a few hours at a local hot spring. At this time, no other cases are known to have reported these same exposures.

On April 4, 2019, the Utah Department of Health is notified by the New Jersey Department of Health of a confirmed case of Legionnaires' disease in a NJ resident who traveled to and stayed at "Ski Resort A" in Park City, UT during his exposure period. The case reported using the resort's hot tub as well as the shower in his room; he does not report any other water exposures.

Public records indicate that the hot tub at "Ski Resort A" was last inspected by the local public health agency (LPHA) on August 19, 2018. At that time, the LPHA noted that the disinfectant and pH levels were too low and there were noticeable debris in the water.

Additional information about the cases

Case	Onset Date	Sex	Age	Lab Test	Pneumonia?	Dates at Resort	Used hot tub?	Used shower?	Room #
#1	12/13/18	F	58	UAT	Yes	12/01 - 12/08	Yes	Yes	319
#2	03/19/19	M	66	UAT	Yes	03/09 - 03/16	Yes	Yes	408

Part One Questions/Discussion Points

1. Is this an outbreak?
2. Who should be contacted to start discussions about this outbreak?
3. Should you conduct an environmental investigation at “Ski Resort A”?
 - Where would you take water samples from?
4. What initial recommendations should you make to Ski Resort A?
 - Think in terms of immediate actions to protect the public.
5. Should you notify the public and/or attempt to find additional cases?

Part Two

Background

You receive contact information from the resort for all guests that have stayed overnight or visited during the day in the past month; 500 total guests.

Preliminary environmental testing indicates presence of Legionella DNA in the hot tub, but not in the potable water system.

In talking with the facility, you find out that their Qualified Pool Operator (QPO) left in October 2018 and they had yet to find a replacement. Hot tub maintenance and testing records are incomplete and the filter hasn't been properly cleaned or replaced since September 2018.

On April 9, 2019, the Utah Department of Health is notified by a local hospital of a UT resident who tested positive for LD. During the case investigation, the patient reported visiting "Ski Resort A" to ski for the day, and used the hot tub afterwards.

Additional information about the cases

Case	Onset Date	Sex	Age	Lab Test	Pneumonia?	Dates at Resort	Used hot tub?	Used shower?	Room #
#1	12/13/18	F	59	UAT	Yes	12/01 - 12/08	Yes	Yes	319
#2	03/19/19	M	66	UAT	Yes	03/09 - 03/16	Yes	Yes	408
#3	04/04/19	M	65	UAT	Yes	03/30	Yes	No	N/A

Part Two Questions/Discussion Points

1. How would you prepare for and perform guest notification and enhanced case finding?
 - Would you go to the media? Would you notify healthcare facilities in UT? Would you notify other states?
 - Think about what you would need to do or information you would need to collect to perform an epidemiologic study.

2. How do the initial environmental sampling results inform the investigation?
 - Discuss if you think there should be environmental remediation of suspected source(s).

3. What additional information should you gather from this 3rd case?
 - Keep in mind the type of test that was used for diagnosis.

Part Three

Background

You send an email to all guests notifying them of their possible *Legionella* exposure, provide background and details about Legionnaires' disease and *Legionella*, provide information about symptoms to be aware of so they can seek medical treatment if needed, and provide a link to complete a survey for the epidemiologic study.

You send a Health Alert to all healthcare facilities in UT notifying them of the outbreak and urging them to consider *Legionella* testing for patients who visited the resort and have clinically compatible illness. Additionally, you send an Epi-X report to other state health departments notifying them of the outbreak so they can identify cases who report travel to UT. You do not receive any additional reports of confirmed illness, but your survey to guests indicate 5 additional suspect cases who experienced clinically compatible symptoms within 2 weeks of staying at the resort.

Final initial environmental testing results indicate widespread presence of live (culture positive) *Legionella pneumophila* serogroup 1 in the hot tub system; specifically in the hot tub filter, jets, and water. The clinical sample from case #3 was positive through culture for *Legionella pneumophila* serogroup 1. Whole genome sequencing performed at CDC on both the environmental isolates and the clinical isolate from case #3 confirm that they are a match.

The facility completes the extensive remediation protocols you provided them.

Additional information about the cases

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Part Three Questions/Discussion Points

1. What additional follow-up should be conducted with the facility?
 - Think about prevention messaging and steps moving forward.

2. What environmental follow-up should be conducted?
 - When can the hot tub be reopened to the public?

3. What should be done internally (within the health departments involved) at the conclusion of the outbreak?

Resources

Model Aquatic Health Code

Description: Guidance document based on science and best practices that can help local and state authorities and the aquatics sector make swimming safer.

Link: <https://www.cdc.gov/mahc/index.html>

Guidelines for Disinfection of Hot Tubs that Contain *Legionella*

Description: CDC guidelines for investigation and mitigation of hot tubs or pools that may be contaminated with *Legionella*.

Link: <https://www.cdc.gov/legionella/downloads/hot-tub-disinfection.pdf>

Environmental Sampling Investigation Videos

Description: Six instructional videos created by CDC for information on various environmental aspects of Legionnaires' disease investigations.

Link: <https://www.cdc.gov/legionella/videos.html>

Environmental Assessment Form

Description: CDC form used to document a facility's water systems, help determine whether to conduct *Legionella* environmental sampling, and if so, develop a sampling plan.

Link: <https://www.cdc.gov/legionella/downloads/legionella-environmental-assessment.pdf>

Environmental Sampling Protocols and Guidance

Description: CDC protocols for collecting environmental samples for *Legionella* testing during an investigation.

Link: <https://www.cdc.gov/legionella/downloads/cdc-sampling-procedure.pdf>

American Industrial Hygiene Association Consultant Listing

Description: List of consultants registered through the American Industrial Hygiene Association that could be used if a facility needs to hire an external consultant during an investigation.

Link: <https://www.aiha.org/about-ih/Pages/Find-an-Industrial-Hygienist.aspx>

CDC Environmental *Legionella* Isolation Techniques Evaluation (ELITE) Program

Description: A program created by CDC and the Wisconsin State Laboratory of Hygiene as a way for laboratories to test their environmental *Legionella* isolation techniques against standardized samples.

Link: <https://wwwn.cdc.gov/elite/Public/EliteHome.aspx>